JP2004-280590A 2004.10.07

FIG. 1

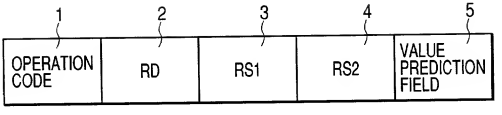

FIG. 2

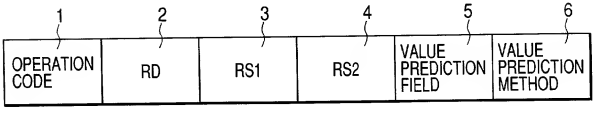

FIG. 3

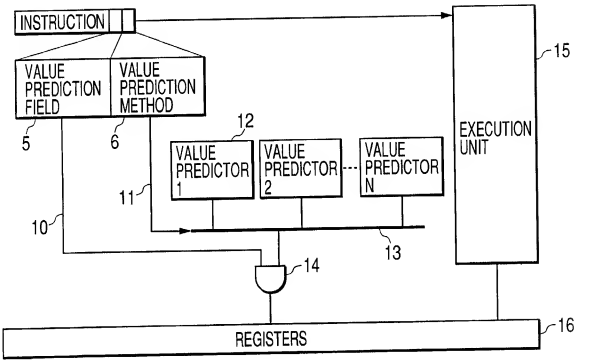
INSTRUCTION
VALUE PREDICTION FIELD
VALUE PREDICTION METHOD
5
6
12
VALUE PREDICTOR 1
VALUE PREDICTOR 2
VALUE PREDICTOR N
11
10
13
14
15
EXECUTION UNIT
16
REGISTERS

FIG. 4

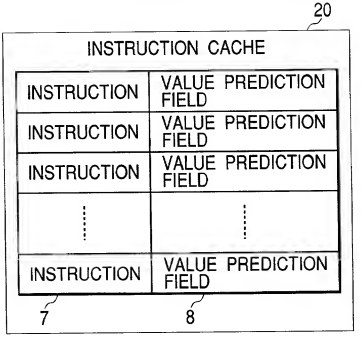

FIG. 5

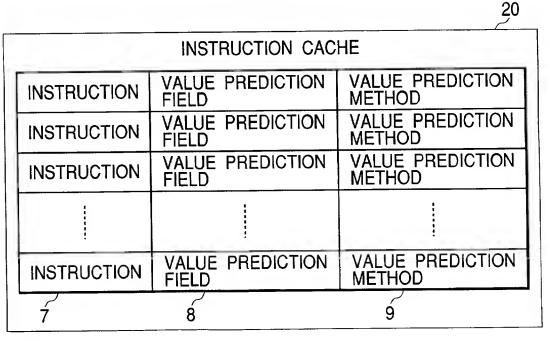

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FIG. 6

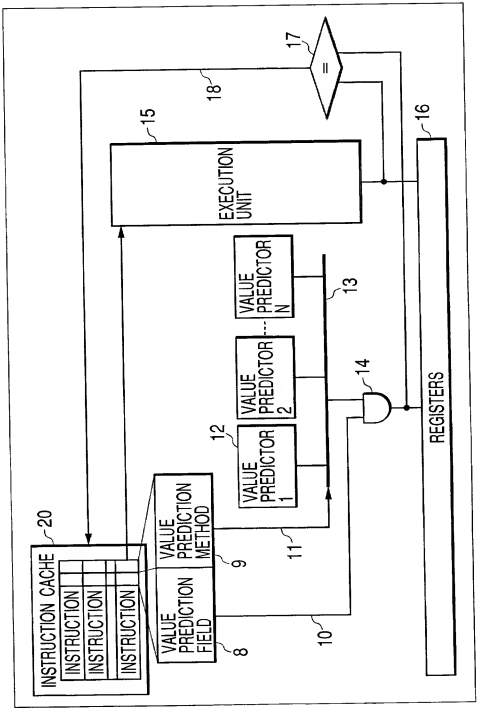

INSTRUCTION CACHE
INSTRUCTION
INSTRUCTION
INSTRUCTION
20
VALUE PREDICTION FIELD
8
VALUE PREDICTION METHOD
9
10
11
12
VALUE PREDICTOR 1
VALUE PREDICTOR 2
VALUE PREDICTOR N
13
14
15
EXECUTION UNIT
16
REGISTERS
17
=
18

FIG. 7

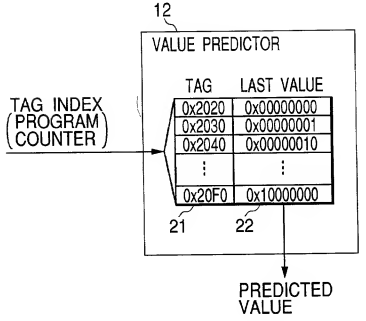
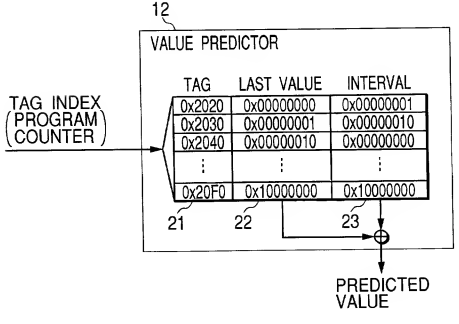


FIG. 8



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JP2007-286901A 2007.11.01

FIG. 9

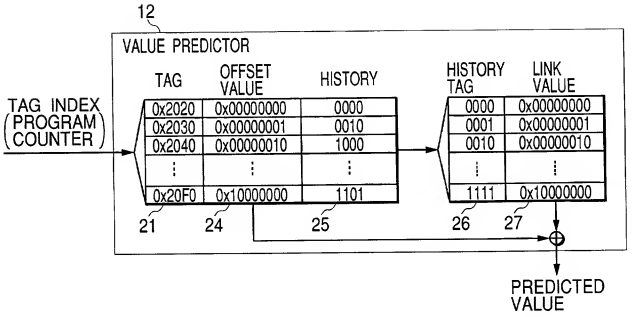

FIG. 10

```
0x2020      xor r1, r1, r1          : r1=0                  r1 IS ALWAYS 0
            loop :
0x2024      add r2, r1, 0x4         : r2=r1+4=4             r2 IS ALWAYS 4
0x2028      add r3, r1, 0x8         : r3=r1+8=8             r3 IS ALWAYS 8
0x202C      add r4, r1, 0xC         : r4=r1+12=12           r4 IS ALWAYS 12
0x2030      bc loop                 : loop
```

FIG. 11

```
0x2020      xor r1, r1, r1          : r1=0      THE INITIAL VALUE OF r1 IS 0
            loop :
0x2024      add r1, r1, 0x1         : r1=r1+1   r1 INCREASES BY 1 EVERY TIME
0x2028      add r2, r1, 0x4         : r2=r1+4   r2 INCREASES BY 1 EVERY TIME
0x202C      add r3, r1, 0x8         : r3=r1+8   r3 INCREASES BY 1 EVERY TIME
0x2030      add r4, r1, 0xC         : r4=r1+12  r4 INCREASES BY 1 EVERY TIME
0x2034      bc loop                 : loop
```

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FIG. 12

```
0x2020      xor r1, r1, r1          : r1=0
0x2024      add r1, r1, 0x1         : r1=r1+1=1   THE INITIAL VALUE OF r1 IS 1
          loop :
0x2028      mul r1, r1, −0x1        : r1=r1×(−1)  r1 ALTERNATES BETWEEN −1 AND 1
0x202C      add r2, r1, 0x4         : r2=r1+4     r2 ALTERNATES BETWEEN 3 AND 5
0x2030      add r3, r1, 0x8         : r3=r1+8     r3 ALTERNATES BETWEEN 7 AND 9
0x2034      add r4, r1, 0xC         : r4=r1+12    r4 ALTERNATES BETWEEN 11 AND 13
0x2038      bc loop                 : loop
```

FIG. 13

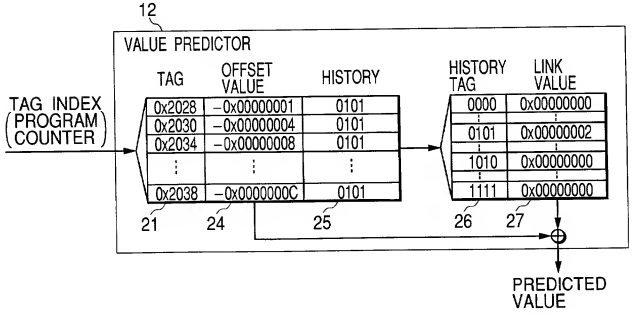

FIG. 14

```
0x2020      ld r1, adr          : r1←Mem [adr]      LOAD THE VALUE ON
                                                    r1 FROM MEMORY
            loop :
0x2024      add r2, r1, 0x4     : r2=r1+4=4         r2 IS ALWAYS 4
0x2028      add r3, r1, 0x8     : r3=r1+8=8         r3 IS ALWAYS 8
0x202C      add r4, r1, 0xC     : r4=r1+12=12       r4 IS ALWAYS 12
0x2030      bc loop             : loop
```

FIG. 15

```
0x2020      ld r1, adr          : r1←Mem [adr]      LOAD THE VALUE ON r1 FROM
                                                    MEMORY
            loop :
0x2024      add r1, r1, 0x1     : r1=r1+1           r1 INCREASES BY 1 EVERY TIME
0x2028      add r2, r1, 0x4     : r2=r1+4           r2 INCREASES BY 1 EVERY TIME
0x202C      add r3, r1, 0x8     : r3=r1+8           r3 INCREASES BY 1 EVERY TIME
0x2030      add r4, r1, 0xC     : r4=r1+12          r4 INCREASES BY 1 EVERY TIME
0x2034      bc loop             : loop
```

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FIG. 16

```
0x2020    xor r1, r1, r1        : r1=0
0x2024    ld r1, adr            : r1←Mem[adr]   LOAD THE VALUE TO r1 FROM
          loop :                                MEMORY
0x2028    mul r1, r1, −0x1      : r1=r1×(−1)    r1 ALTERNATES BETWEEN −1 AND 1
0x202C    add r2, r1, 0x4       : r2=r1+4       r2 ALTERNATES BETWEEN 3 AND 5
0x2030    add r3, r1, 0x8       : r3=r1+8       r3 ALTERNATES BETWEEN 7 AND 9
0x2034    add r4, r1, 0xC       : r4=r1+12      r4 ALTERNATES BETWEEN 11 AND 13
0x2038    bc loop               : loop
```

FIG. 17

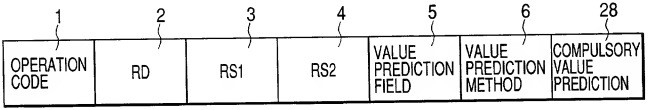

FIG. 18

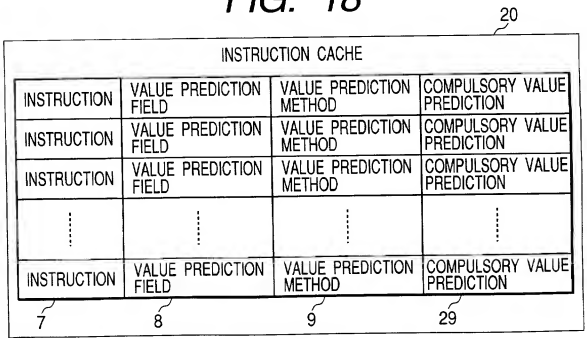

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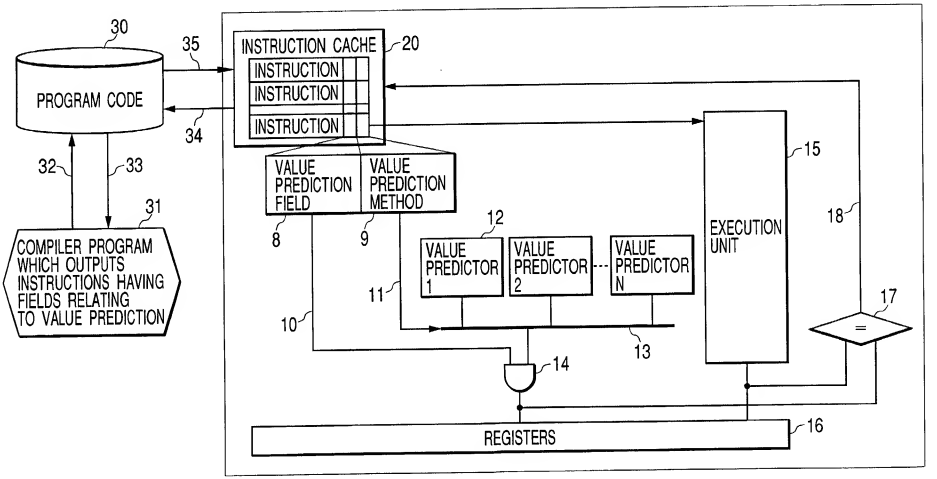
FIG. 19


30
PROGRAM CODE
35
34
INSTRUCTION CACHE
20
INSTRUCTION
INSTRUCTION
INSTRUCTION
32
33
31
COMPILER PROGRAM WHICH OUTPUTS INSTRUCTIONS HAVING FIELDS RELATING TO VALUE PREDICTION
VALUE PREDICTION FIELD
VALUE PREDICTION METHOD
8
9
12
VALUE PREDICTOR 1
VALUE PREDICTOR 2
VALUE PREDICTOR N
11
10
13
14
15
EXECUTION UNIT
18
17
=
REGISTERS
16